WHAT IS CLAIMED IS:

- 1. A modulation frequency tunable optical oscillator, comprising:
- a wavelength combiner for receiving a pumping light beam having a predetermined wavelength;
 - a loop mirror connected to one side of the wavelength combiner;
- an amplifying optical fiber connected to the other side of the wavelength combiner;
- a coupler connected to the amplifying optical fiber for an output light beam; and
- a pair of optical fiber grating mirrors connected to the coupler, wherein a light beam outputted from the amplifying optical fiber is reflected in the loop mirror with a different reflectance depending on each wavelength, passes through the amplifying optical fiber, and then is inputted to the optical fiber grating mirrors, whereby the optical fiber grating mirrors constitute a dual laser mode resonator in such a way that the light beams having different wavelength bands are reflected in the optical fiber grating mirrors, respectively.
- 2. The modulation frequency tunable optical oscillator according to claim 1, wherein the wavelength combiner and the loop mirror are connected through a 50% coupler.

- 3. The modulation frequency tunable optical oscillator according to claim 1, wherein the loop mirror comprises a distributed compensation optical fiber and a polarization controller.
- 4. The modulation frequency tunable optical oscillator according to claim 1, wherein the coupler is a 10% coupler.
- 5. The modulation frequency tunable optical oscillator according to claim 1, wherein a pair of optical fiber grating mirrors include a wavelength fixed optical fiber grating mirror and a wavelength tunable optical fiber grating mirror.
- 6. The modulation frequency tunable optical oscillator according to claim 1, wherein a pair of optical fiber grating mirrors are arranged in a serial manner.